HOWARD MARKLEIN
STATE REPRESENTATIVE • 51ST ASSEMBLY DISTRICT

October 24, 2011

Thank you, Chairman Kramer and the rest of the Assembly Committee on Financial Institutions for allowing me to testify today in favor of Special Session Assembly Bill 21, otherwise known as The Next Generation Jobs Act. Today, I am going to explain the two major items in the legislation and emphasize why it is so necessary to invest in this successful industry.

The Next Generation Jobs Act creates a Next Generation Reserve Fund. The fund would be generated by allocating a portion of the growth in the income taxes from the bioscience industry. The fund will be self funded, since only the additional income taxes from the growth of the businesses will be used to grow the fund. The Bioscience fund growth is capped at $50 million annually and $500 million over the 15-year life of the program.

The bill also creates a Next Generation Jobs Board to foster the growth of small start-up, bioscience businesses in Wisconsin. The 12-member Board consists of members of the general public who have outstanding knowledge and leadership in the fields related to the bioscience sector and research members from Wisconsin's universities and colleges. The board would be authorized to make grants, issue loans, and make direct investments in bioscience businesses headquartered in Wisconsin.

The bill requires no bonding or borrowing. The fund is created for only investment in Wisconsin's bioscience companies by leveraging a dollar-for-dollar match on investment in the industry. Since the fund is comprised of bioscience company payroll taxes, the fund only grows when the bioscience industry grows.

The legislation encourages job growth in a successful industry. The wages paid in the bioscience sector are above the state average. Bioscience is an industry that provides support for other job creators like the agricultural, pharmaceutical, and medical industries. This legislation comes at a time when Wisconsin needs good jobs that allow us to build, manufacture, grow, or research here in the state. An investment in bioscience is an investment in our state's future.

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SWIB State of Wisconsin Investment Board

October 24, 2011

The Honorable Bill Kramer
Chair, Financial Institutions Committee
State Capitol, Room 115 West
Madison, WI 53702

Re: SS-AB-21

Dear Representative Kramer:

I am writing to express support by the State of Wisconsin Investment Board (SWIB) for authorizing SWIB to provide administrative and professional support to the Next Generation Reserve Board (NGRB) which would be created by this legislation. SWIB has worked closely with the proponents of the bill to craft the provisions enabling it to provide those services.

The bill would allow SWIB to use the expertise, resources and relationships already at its disposal to assist the Next Generation Reserve Board, and receive appropriate compensation for those services. The relationship should provide advantages to both SWIB and the NGRB, while maintaining clear distinction between the economic development goals of the NGRB and the fiduciary duties SWIB has for the retirement and other trust funds it serves. The flexibility authorized would allow the two entities to define and adjust services to best meet circumstances.

SWIB already invests multiple trust funds and separately assesses the costs of its services to those funds, so the administrative mechanisms are largely in place. The authorization in the bill also would allow SWIB to assist other state entities with similar efforts that may be undertaken in the future. SWIB looks forward to the opportunity to help in making the Next Generation Reserve Fund a success for Wisconsin.

Sincerely,

Keith Bozarth
Executive Director

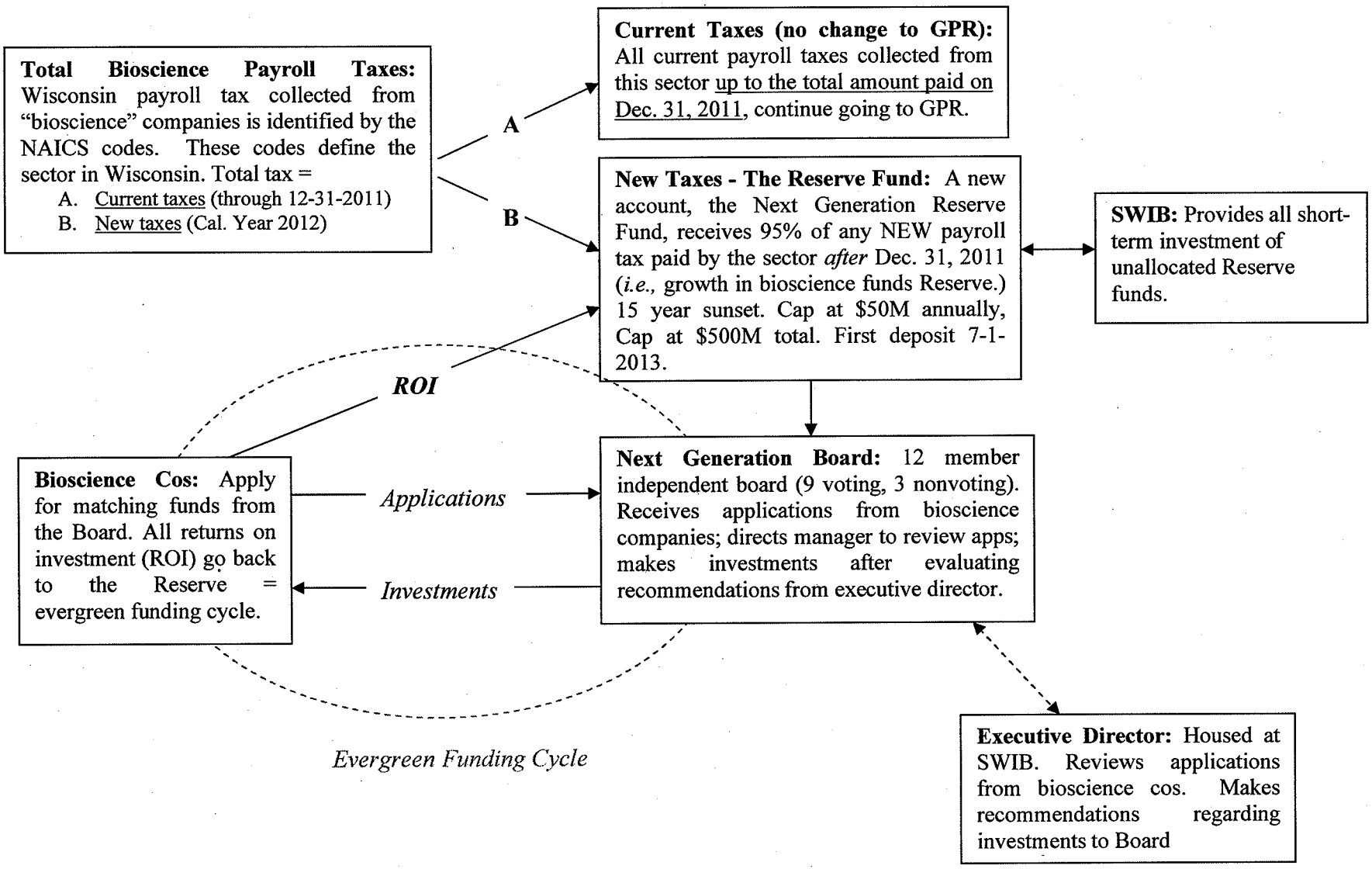
121 E. WILSON STREET • BOX 7842 • MADISON, WI • 53707-7842
PHONE: (608) 266-2381 • FAX: (608) 266-2436 • WWW.SWIB.STATE.WI.US

NAICS Codes in LRB-3126 - Next Generation Jobs Act

311221, 311222, 311223, 325193, 325199, 325221, 325311, 325312, 325314, 325320, 325411, 325412, 325413, 325414, 334510, 334516, 334517, 339112, 339113, 339114, 339115, 339116, 541380, 541711, 541712, 521511, 621512, 621491, 621493, or 622110.

NAICS Code	Industry
311221	Wet corn milling
311222	Soybean processing
311223	Other oilseed processing
325193	Ethyl alcohol manufacturing
325199	All other basic organic chemical manufacturing
325221	Cellulosic organic fiber manufacturing
325311	Nitrogenous fertilizer manufacturing
325312	Phosphatic fertilizer manufacturing
325314	Fertilizer (mixing only) manufacturing
325320	Pesticide and other agricultural chemical manufacturing
325411	Medicinal and botanical manufacturing
325412	Pharmaceutical preparation manufacturing
325413	In-virtro diagnostic substance manufacturing
325414	Other biological product manufacturing
334510	Electro-medical appartus manufacturing
334516	Analytical laboratory instrument manufacturing
334517	Irradiation apparatus manufacturing
339112	Surgical and medical instrument manufacturing
339113	Surgical appliance and supplies manufacturing
339114	Dental equipment and supplies manufacturing
339115	Ophthalmic goods manufacturing
339116	Dental Laboratories
541380	Testing Labs (part)
541711	R&D in biotechnology
541712	R&D in the physical, engineering and life sciences (except biotech)
621511	Medical laboratories
621512	Diagnostic imaging centers
621491	HMO Medical Centers
621493	Freestanding Ambulatory Surgical and Emergency Centers
622110	General Medical and Surgical Hospitals

Wisconsin's Next Generation Jobs Act: *Evergreen Funding Cycle*



Evergreen Funding Cycle

THE CONTRIBUTION OF THE BIOSCIENCE INDUSTRY TO THE WISCONSIN ECONOMY

PREPARED FOR

BIOforward Wisconsin

PREPARED BY

Sammis B. White, Ph.D.
Steven C. Deller, Ph.D.
William Kort
Michael Kavalar
Michael Slezak
Cal Stoffel

Center for Workforce Development
University of Wisconsin-Milwaukee

SEPTEMBER 2010

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LETTER FROM THE DIRECTOR

DEAR READER,

BioForward is pleased to share with you "The Contribution of the Bioscience Industry to the Wisconsin Economy," a comprehensive analysis of the significant economic impact the bioscience industry has on Wisconsin. Indeed, the report shows that the bioscience industry is paying high wages, creating jobs and putting Wisconsin in a stronger position to transform its economic landscape in ways some previously thought unimaginable.

As the state's leading industry group, BioForward believes that bioscience should be at the forefront of Wisconsin's economic development strategy, and the evidence to support this is compelling:

- Between 2004 and 2009 bioscience employment grew by nearly 3% in contrast to the rest of the economy that shrunk by over 3%
- The average bioscience worker has earnings that are 64 percent higher than the earnings of a typical Wisconsin worker
- More than 640 bioscience businesses have created nearly 24,000 private sector jobs with a total economic impact of close to $7 billion
- The number of bioscience businesses grew by 19% over the last 5 years and increased their total payroll by 22% in current dollars

Wisconsin needs to take a serious look at how the state can and properly should leverage the substantial advantages we have in this dynamic industry. Wisconsin doesn't need a wakeup call on this issue – most everyone knows that the biosciences industry can have an ever-increasing and significant impact on the Wisconsin economy. Now, it's time for action, and I hope you find this report interesting and helpful in better understanding the tremendous potential that lies ahead. It is time to seize this opportunity.

BioForward wishes to express its thanks to the sponsors of this study: Pfizer, PhRMA and MGE of Madison. We are most grateful for their support.

Lastly, BioForward and its members want to express our deep and sincere appreciation to Sammis B. White and his team of five researchers from the University of Wisconsin-Milwaukee Center for Workforce Development. Their conscientious, thorough and detailed academic analysis lends significant credibility that should help policymakers and those who care about Wisconsin's future economic growth take advantage of this opportunity.

Our state's motto is "Forward."

Let's get going.

Sincerely,

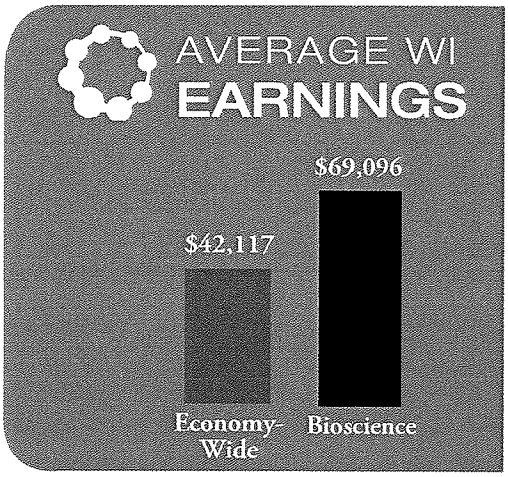
Bryan Renk
Executive Director

EXECUTIVE SUMMARY

The bioscience industry has been a rapidly growing sector of the U.S. economy. According to Battelle, between 2001 and 2008, employment in the sector grew at a rate of 15.8% in both Wisconsin and the U.S. overall. This compared to an overall growth of 2.1% and 3.5%, respectively, across all industries. The sector also reportedly grew by 1.4% in the first year of the Great Recession. In 2008, U.S. bioscience employment was reported as being 1,420,324 workers and a $270 billion a year industry (Battelle 2010). The growth, vitality, and size of the industry indicate that it warrants attention.

This report examines the bioscience industry in Wisconsin and its impact here. The industry includes employers in four industry sub-sectors: Agricultural Feedstock and Chemicals, Drugs and Pharmaceuticals; Medical Devices and Equipment; and Research, Testing, and Medical Laboratories. This standard definition of bioscience has been developed and refined by Battelle, and consists of employers classified under 27 different North American Industry Classification System (NAICS) codes.

This report focuses on Wisconsin and attempts to detail the size of the bioscience sector, its basic composition, its geographic distribution, its employment and payroll contributions to the state economy, and its secondary effects on the Wisconsin economy. The results presented in this report are the result of a conservative assessment of the bioscience industry (see the sections on methods and analysis for more detail).



- Bioscience is a source of high-paying jobs: the average earnings per worker in Wisconsin bioscience were $69,096 in 2009, 64% higher than the economy-wide Wisconsin average of $42,117.

- Between 2004 and 2009 the bioscience industry in Wisconsin expanded the number of business establishments by 19%, grew the total payroll by over 22% in current dollars while increasing average earnings per worker by 19%. Total bioscience employment grew by 3% in contrast to the rest of the state economy that shrunk by over 3%.

> "[Between 2004 and 2009] bioscience employment grew by 3% in contrast to the rest of the economy that shrunk by over 3%"

- Bioscience employers are involved in a wide-range of industries and in many regions of the state. Bioscience employment is found in 25 NAICS industries explored and in 53 of Wisconsin's 72 counties.

- Bioscience employment in Wisconsin generates additional income in Wisconsin. The direct employment of 23,919 private-sector bioscience workers generates a total of $6,035,606,392 as the earnings of employees and the needs for other goods and services from the employers work their way through the Wisconsin economy. The impact of the academic bioscience research adds another $739M to that, bringing the total to $6.8B in income generated.

- There were 647 bioscience firms in Wisconsin at the end of 2009. They operated in 751 different establishments.

- In the fourth quarter of 2009 the Bioscience sector in Wisconsin directly employed 23,919 workers. If we include the research and related staff at Wisconsin universities that were working on the $760M of bioscience research undertaken in 2008, the total becomes 28,389 persons.

- The total direct payroll for bioscience companies in 2009 was $1.653 billion. If we include the university research workers, the total is even higher.

- Direct bioscience employment in Wisconsin generates additional jobs in Wisconsin. The direct employment of 23,919 private sector bioscience workers creates a total of 63,300 jobs in the state (including the original 23,919). The direct employment of 4,470 academic researchers creates another 4,470 jobs through economic multiplier effects. The total number of jobs created by academic and private-sector biosciences is 72,240.

- Those same income dollars generate a substantial amount of tax dollars within the state as a whole. In sum, across five forms of taxation, the income generated from private-sector bioscience employment alone generates an estimated $547,823,388 for Wisconsin's governments. A simple estimate was made for the academic employment: it would likely enlarge that figure by about 12% or some $67M, bringing the total to $614 M in tax revenue for various levels of government.

- When examined regionally, the gains are heavily concentrated in the Milwaukee 7 and Thrive regions. The impact of private-sector bioscience in the Milwaukee 7 region is to have created an estimated 32,261 total jobs and $3.3B in total income. For Thrive the respective numbers are 16,947 jobs and $1.5B in total income. The combination is 77% of the bioscience jobs added in the state and 80% of the total income generated by bioscience employers.

"Between 2004 and 2009 the bioscience industry in Wisconsin expanded the number of business establishments by 19%, grew the total payroll by over 22% in current dollars while increasing average earnings per worker by 19%"

- Combining these numbers with the academic research numbers reveals that the total jobs attributable to bioscience in the Thrive region is 23,635. For Milwaukee the number of direct and indirect jobs created by bioscience is 34,403.

- In terms of total income generated by bioscience in academic and private sectors in the Milwaukee 7 region, the total is estimated at $3.5B; in Thrive the total is estimated to be $2.1B. These numbers indicate the importance of bioscience to these regions.

- Although geographically dispersed, the activity is heavily concentrated in the Milwaukee and Madison areas. Three counties – Dane, Milwaukee, and Waukesha – account for over 69% of the total, direct, bioscience employment in the state.

- The Milwaukee 7 region, seven counties in southeast Wisconsin, contains markedly more bioscience jobs than the Thrive region, the area around Madison. The M 7 region is home to 12,126 private-sector bioscience jobs while Dane-based Thrive is home to 7,307 such jobs.

- If college and university bioscience researchers are counted as well, Thrive had 10,647 bioscience employees while the Milwaukee 7's total was 13,332.

- As with much of the employment in Wisconsin, bioscience establishments tend to be small. The median size is 6 employees, and 73% of employer establishments had fewer than 20 employees.

"6.8 billion in income generated"

INTRODUCTION

Biosciences are a major industry sector in the U.S. economy. The industry is reported to currently be in the neighborhood of a $270 billion enterprise annually, and it is growing. The current scale, its growth, and its growth potential have all attracted attention. Most states, including Wisconsin, have identified this sector as critical to the state's future. Some states are endowed with bioscience ingredients and have had more success than others in growing these industries. The question for this report is in what ways and at what scale does the bioscience sector contribute to the Wisconsin economy currently.

Biosciences include a range of industries and activities. The common theme that unites them in one sector is that they "apply knowledge of the way in which plants, animals, and humans function" (Battelle 2010). The sector covers a wide range of different industries that include manufacturing, services, and research. It involves several sciences, not the least of which are biology, chemistry, and physics and overlaps among them, environmental science, and engineering. At this point in time biosciences include 27 different industry groups as defined in the North American Industry Classification System (NAICS). These 27 industries are often clustered into four encompassing subsectors: Agricultural Feedstock and Chemicals; Drugs and Pharmaceuticals; Medical Devices and Equipment; and Research, Testing, and Medical Labs.

Table 1 reveals the distribution of specific industries within the four subsectors. The sub-sector titles by themselves show that quite a variety of industries are included. Bioscience at one time was thought to be focused on biomedical solutions to human problems. It was soon clear bioscience should include several life sciences, including those applying to the lives of humans, animals, and plants Furthermore, as testing and imaging began to involve biology, chemistry and physics as well as engineering and computer science, medical electronic instruments were added as were medical equipment and supplies, followed by the application of knowledge and tools, bringing testing labs, research, and medical and diagnostic labs into the definition. There is still some debate as to the appropriateness of particular industries in the definition. But Battelle is the standard setter, and the list is the definition as of 2010.

It is likely that within a few years there will be new NAICS codes created to cover industries that are just beginning to develop. The science is ever evolving and expanding. The needs to be met are growing, thus creating markets that some will attempt to serve. That is part of the appeal of promoting bioscience as an important component of economic development.

In recent years we have experienced the development of bio-based energy, be it ethanol, bio-diesel, or biomass. New imaging technologies and their applications have expanded, given new markets such as those created by Homeland Security and the continuing search for uncovering abnormalities in human and animal bodies. New interests have developed in both biomimicry and the use of nutrients once thought to be and now known to be found in specific foods. The list of stimulants and resulting findings is ever growing; biosciences are and will remain an incredibly dynamic field and industry.

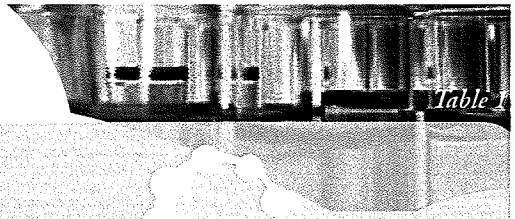


Table 1

BIOSCIENCE INDUSTRIES BY NAICS CODE

NAICS CODE INDUSTRY

Agricultural feedstock & chemicals manufacturing

311221 Wet corn milling

311222 Soybean processing

311223 Other oilseed processing

325193 Ethyl alcohol manufacturing

325199 All other basic organic chemical manufacturing

325221 Cellulosic organic fiber manufacturing

325311 Nitrogenous fertilizer manufacturing

325312 Phosphatic fertilizer manufacturing

325314 Fertilizer (mixing only) manufacturing

325320 Pesticide and other agricultural chemical manufacturing

Drugs & Pharmaceuticals

325411 Medicinal and botanical manufacturing

325412 Pharmaceutical preparation manufacturing

325413 In-vitro diagnostic substance manufacturing

325414 Other biological product manufacturing

Medical Devices & Equipment

334510 Electromedical apparatus manufacturing

334516 Analytical laboratory instrument manufacturing

334517 Irradiation apparatus manufacturing

339112 Surgical and medical instrument manufacturing

339113 Surgical appliance and supplies manufacturing

339114 Dental equipment and supplies manufacturing

339115 Ophthalmic goods manufacturing

339116 Dental laboratories

Research, Testing & Medical Laboratories

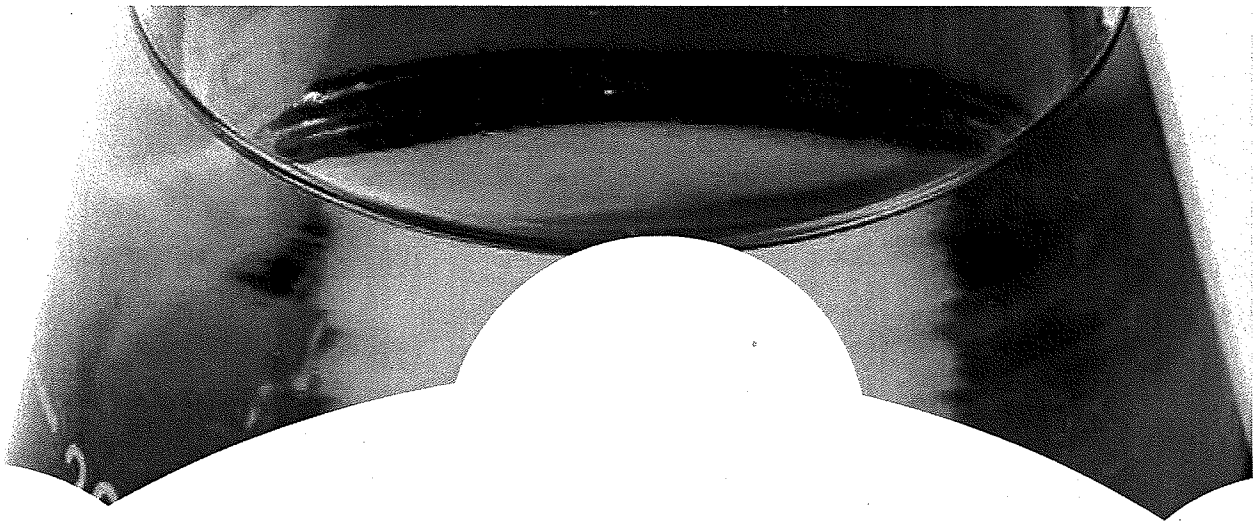
541380 Testing Labs (pro)

541711 R&D in biotechnology

541712 R&D in the physical, engineering and life sciences (except biotech)

621511 Medical laboratories

621512 Diagnostic imaging centers



METHODS OF ANALYSIS

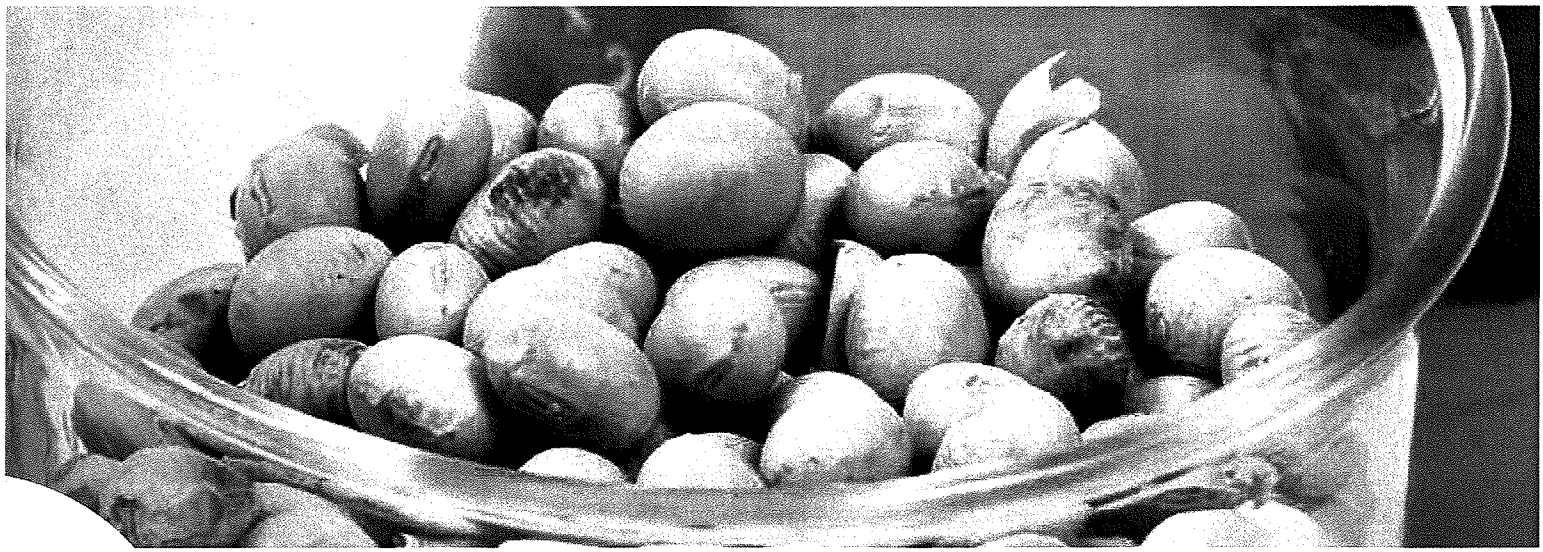
To respond to the assignment of calculating the impact of the bioscience sector, step one must be identifying the actors involved in the sector. One could attempt to identify actors from public knowledge and media. We could start with high profile firms like GE Healthcare and Promega. But from there many would start stumbling. The solution, therefore, is to utilize a comprehensive list of employers in the state that includes not only names but industries and other descriptors. There are only a few possible sources. The one selected for this study because of its inclusiveness and detail is the state's administrative file for Unemployment Compensation Insurance. It is the state's contribution to the national Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) data. The one difference is that the file we were able to use has details on each employment establishment. This allows more refined insights than can be gleaned from the more condensed report sent to the federal government.

The file lists over 158,000 establishments reporting employment and wages paid to the Wisconsin Department of Workforce Development in the last quarter of 2009. That is the most recent quarter for which data are available. The establishments reporting in this file all have a six-digit NAICS code that reveals that industry in which the plurality of their income is derived. The file also lists other employer characteristics that are used in the ensuing analysis. But the key element is employment, so that that information can be used in a model to then estimate the secondary and tertiary impacts on the economy beyond the initial employment of individuals in these establishments (almost exclusively private businesses).

> "... firms that are not in the data do apply bioscience in their businesses"

To supplement this main database, we made another effort to expand the understanding of bioscience in Wisconsin by searching a second database of companies in Wisconsin that do not list bioscience as their primary NAICS but that do list bioscience as something they do. The hope was that this exercise would identify other firms and ways in which biosciences play a role in the Wisconsin economy. To take this step we consulted what is called the Harris Data list, named for the firm that creates and sells access to the list. Unfortunately, this exercise proved a bit futile, since nine of the 56 firms identified had reported themselves as primarily bioscience on our main list of firms. Then we had trouble reaching about half of the remaining firms. Some we reached reported some form of bioscience occurring at the business. But several said that they did nothing in bioscience. The conclusion is that firms that utilize bioscience ins some small way do exist; we just did not have a very productive way of learning about them.

A third effort made to further supplement our primary data. That involved asking a Wisconsin firm, Vandewalle and Associates, that has done business in many parts of the state to construct a list of the firms that from their experience should be on a list of bioscience firms in the state. They did not have access to our master list, just their field work. That list consisted of 63 names. But in this case 47 of these firms were already on our master list. The remaining firms proved to be difficult to find the correct person with whom to discuss their use of bioscience, if they used it at all Thus, we came to rely heavily on the initial database for all numeric analysis.



EXAMPLES OF THE APPLICATION OF BIOSCIENCE

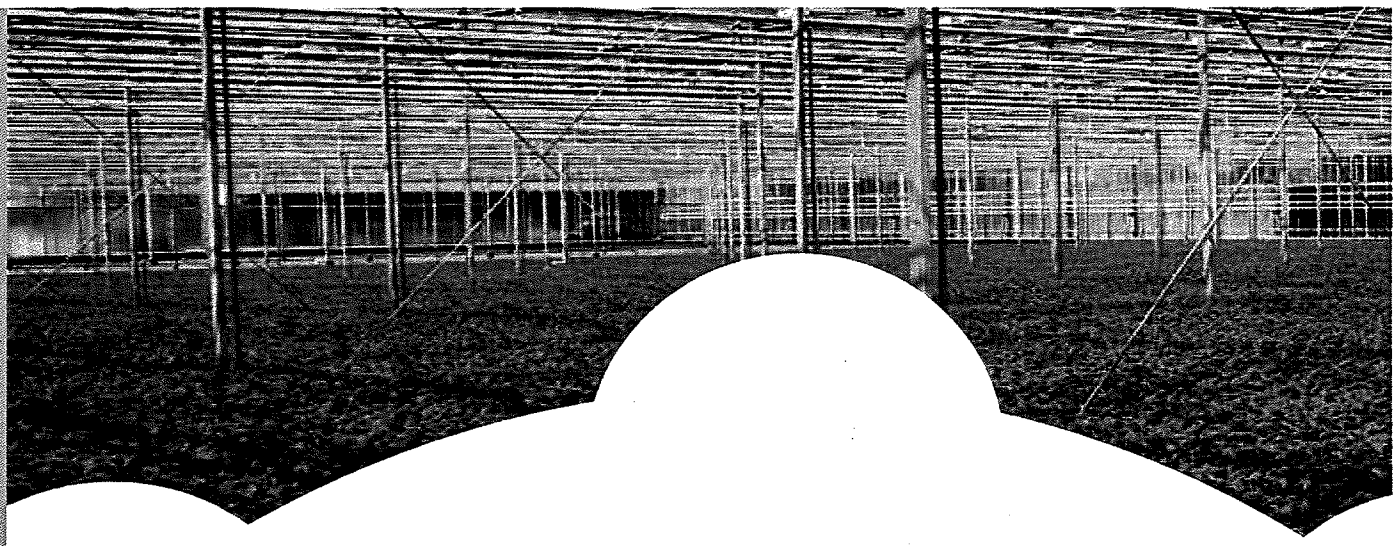
Below are four brief descriptions, gathered in interviews of firms that are not included in the NAICS code data, but that do apply bioscience in their business.

EMD Crop Bioscience makes a product similar to fertilizer. They do not like to call their product "fertilizer," however. EMD grows bacteria that farmers use on seed to aid crop growth. Bioscience is involved in the fermentation needed to grow the bacteria as well as in R&D, quality control, and engineering.

ATL (Ad Tech & Label Company) manufactures disposable medical products. Bioscience is used to develop and test their products that include medical foams and tapes, in addition to antimicrobial coatings. These coatings stop the growth of bacteria on a product's surface.

Athea makes insecticides, fungicides, and herbicides as part of their company portfolio. Bioscience is involved in R&D and the creation and testing of the company's chemical products.

3D Molecular Design is not primarily a bioscience company in the traditional definition. The firm manufactures high-detail, three-dimensional physical models of proteins and other molecular structures using rapid prototyping technology. Computer models are converted to an engineering format which instructs a laser machine to create crystal models. The physical models offer opportunity for tactile interaction with the structures.



ECONOMIC ANALYSIS

The economy of the state revolves around the sale of goods and services. Individuals who work for employers get paid. These individuals in turn spend some or all of those wages in other establishments, generating the need for others to work and incomes to be earned. Additionally, the original firm needs to buy inputs beyond labor; some need services and others need materials and services. They buy these locally to the degree that they can. A manufacturing firm in Milwaukee, for example, might be able to buy many parts and intermediate materials from firms in the Milwaukee economy. But a manufacturing firm in a region without many other such firms is more likely to purchase goods and services elsewhere. The dollars they spend will not be spent in the local economy to the same degree as is likely to happen in a large metropolitan area.

Those relationships can be and are tracked, so that economic models can be built that generate numbers reflecting the impact of a dollar spent locally on the local economy or the impact of a job in a particular industry locally on the surrounding economy. The term applied to such models is usually "economic impact models." Three competitors dominate this model space, the Bureau of Economic Analysis, the R.E.M.I. model created at the University of Massachusetts, and IMPLAN, created by the U.S. Forest Service. For this analysis IMPLAN has been chosen.

IMPLAN requires that a specific geographic area be chosen and the specific employment numbers be inserted for the industries in question. Thus, we generated employment numbers for geographic areas – the state and individual counties, derived within each geographic area by the 21 NAICS codes used currently in Wisconsin, and then inserted these employment totals in a statewide analysis followed by the insertion of the smaller numbers in each of the seven economic development regions in the state (Note that 25 of the 27 bioscience NAICS codes are represented in Wisconsin, but only 21 codes included enough data to include in this analysis). The Wisconsin Department of Commerce has chosen to work with economic development regions. These seven regions encompass 58 of the state's 72 counties. Fortunately for this analysis, these counties contain almost 99% of bioscience employment in the state. We analyzed the impacts of bioscience establishments for the state as a whole and for each of the seven regions.

The information that IMPLAN gives us is the secondary employment impacts, know as indirectly created employment and the induced employment. The first comes from the expenditures of the employers on goods and services in the region in question. The second comes from the expenditures of the employees of the initial bioscience employers and the expenditures of the workers from the other places of employment that are affected by purchases from the initial bioscience employers. The result is a multiple of both employment and income above that generated by the initial employers.

> "The numbers that appear below are the best that can be documented, but they still understate the true role of bioscience in Wisconsin."

One point that should be stressed before proceeding is that the numbers that appear below are either direct from employers or they come from accepted models of the economy that help to identify employment and income gains related to initial employment in bioscience. That said, it is important to note that an extra effort has been made to ensure that multipliers of economic activity are conservative; it is likely that the effort to estimate the impact of bioscience on the state economy understates its true impact. Multipliers of economic impact were carefully screened and adjusted to better reflect their true impact. Some reports, even the Battelle/Bio State Biosciences Initiative 2010 talks of an employment multiplier for bioscience jobs that is 5.8 jobs per each bioscience job. In this report the largest employment multiplier is 2.6; others are as small as 1.3.

THE EXTENT OF BIOSCIENCE EMPLOYERS IN WISCONSIN

Bioscience is an important industry in Wisconsin. There were at least 647 bioscience firms with employees in the state at the end of 2009. This statement, though correct, understates the actual number of firms that are involved with bioscience. The numbers that follow are largely drawn from one source of information on bioscience, the Wisconsin Department of Workforce Development's Unemployment Compensation data file on reporting employers. These data are used by the U.S. Bureau of Labor Statistics for several official descriptions of the employment and earning picture in Wisconsin and the nation.

But this file is not complete in terms of bioscience. It very likely understates the number of firms and employees involved in bioscience because some firms fail to report, others had no paid employees at the end of 2009, others report their employment under other NAICS codes but are involved to some degree in bioscience, and still others report a few direct employees but hire additional workers as consultants or just pay non-bioscience firms for services rendered. This last creates jobs that may be counted in other industries, just not bioscience. The list goes on; the point is that the numbers that appear below are the best that can be documented, but they still understate the true role of bioscience in Wisconsin.

Getting back to those that self-identify as bioscience, these firms are largely single-location operations, but collectively the 647 employers have 751 different business establishments. The bioscience-employer payroll of all employees in the state's database is very close to 24,000 workers.

CHARACTERISTIC	MEASURE
Annual Payroll	$1,652,717,076
Employment	23,919
Ave. Wage/Wkr	$69,096
# Firms	647
# Establishments	751

Two other useful pieces of information also appear in this text table. One is that the total payroll in private-sector bioscience in Wisconsin in 2009 was $1.652B. That is a substantial figure. Perhaps of greater interest to some is the fact that the average earnings per worker in bioscience was $69,096, some 64% greater than the average earnings of all workers in Wisconsin in 2009.

The next question that might arise is that of the distribution of employment across bioscience industries. Are Wisconsin's jobs concentrated in just a few industries or are they distributed in a mix of industries. One insight into that question appears in Table 2. In that table it becomes clear that one industry dominates, Irradiation apparatus, but that nine other industries have more than 1000 workers in the state, with one industry having more than 2,300. Those numbers would suggest that there is diversification in the bioscience industry in Wisconsin.

Table 2
Private Bioscience Employment by Detailed NAICS Code, Wisconsin

NAICS	DESCRIPTION	EMPLOYMENT
311221	Ethanol manufacturing	40
325193	Ethyl alcohol manufacturing	339
325199	All other basic chemical mfg.	1,444
325314	Fertilizer mfg. or mixing	474
325320	Pesticide & other ag chemical mfg	348
325411	Medicinal & botanical mfg	300
325412	Pharmaceutical preparation mfg.	1,527
325413	In-vitro diagnostic substance	431
325414	Biological product (not diagnostic)	1,347
334510	Electro-medical apparatus	706
334516	Analytical lab instruments	685
334517	Irradiations apparatus	5,891
339112	Surgical & medical instruments	1,553
339113	Surgical appliance & supplies	1,172
339114	Dental equipment & supplies	410
339115	Ophthalmic goods	420
339116	Dental Laboratories	1,254
541380	Testing Laboratories	1,802
541711	R&D in biotechnology	1,007
621511	Medical Laboratories	2,304
621512	Diagnostic Imaging Centers.	466
	Total Sum - Employees	23,919
	Total Count - Establishments	751

DISTRIBUTION BY SIZE OF ESTABLISHMENT

Bioscience to many is a relatively new field. That would suggest that employment is concentrated in smaller employers. Table 3 reveals the distribution of employers and employment by size. The numbers reveal that the expectation is correct: the vast majority of bioscience employers are small in scale.

Table 3 Distribution of Private Bioscience Employment by Size of Employers, Wisconsin

# OF EMPLOYEES	# ESTABL.	% ESTAB.	# EMPLOYEES	% EMPLOYEES
1 - 4	327	44%	688	3%
5 - 9	128	17%	851	4%
10 - 19	87	12%	1,199	5%
20 - 49	117	16%	3,856	16%
50 - 99	43	6%	2,946	12%
100 -249	27	4%	3,902	16%
250 +	22	3%	10,477	44%
Totals	751	100%	23,919	100%

Furthermore, the average establishment employees 32 persons, but the median establishment employs only 6. This distribution suggests that there are several large employers but that 73% of the establishments have fewer than 20 employees while 61% have fewer than ten.

DISTRIBUTION BY COUNTY

One way to examine the distribution of bioscience employment is to look at individual counties. Since 53 counties are reported to have at least one bioscience employer, the list of affected places is long. But since data reporting requirements do not allow details on small numbers of employers, just the top 10 counties by bioscience employment will be noted. They appear below in Table 4.

Bioscience employers are distributed across the state. Much of the media attention has focused on Dane County, the high-profile work on stem cells, and the number of new bio-science starts that have spun out of research undertaken at the University of Wisconsin-Madison. Dane County is home to the largest number of bioscience employees of any county in the state, either of two ways that we look. It has 6,226 in private employment in this sector. The county also is home to an estimated 3,344 additional jobs tied to research done at UW-Madison (this topic is discussed in detail later). If these are added to the private employment numbers, the total is 9,570 jobs in bioscience in Dane County alone.

Milwaukee County's private bioscience employment is very similar to that of Dane County's, 6,182. Milwaukee also has additional bioscience employment from university research at the Medical College of Wisconsin, an estimated 679 jobs, UWM (64), and Marquette University (38). When these figures are combined with those from the private sector, the total is 6,963.

The third county that has a significant number of bioscience jobs is Waukesha. It has 4,175 such jobs. It does not benefit from the presence of research universities, but the employment is still substantial. Brown, Sheboygan, Kenosha and Racine counties all have between 500 and 1,000 employees in bioscience, marking them as significant participants in the bioscience industry.

If private, bioscience employment from Waukesha and Milwaukee counties is combined, the total is 11,458, a figure that is substantially higher than that of Dane County. The fact that bioscience employment in these two counties is the largest concentration in the state may surprise some readers. There is little question that the media focus on stem cells would imply bioscience is based in Madison. But with the expanded definition of bioscience that includes medical devices & equipment as well as research, testing, and medical laboratories, the largest concentration is in southeast Wisconsin.

Table 4
Private Bioscience Employment and Payroll in Selected Counties

COUNTY	BIOSCI EMP.	BIOSCI PAYROLL
Dane	6,226	$403,704,928
Milwaukee	6,182	437,746,728
Waukesha	4,175	408,244,548
Brown	949	38,862,248
Sheboygan	650	35,722,356
Kenosha	521	35,523,500
Racine	715	28,644,464
Washington	412	26,841,124
Jefferson	409	30,460,280
Portage	314	14,835,916

Because there are three counties that are the centers of bioscience in Wisconsin, it is important to examine the scale of their payrolls and those of the next several counties to learn just how important the bioscience sector is to the communities. The county with the largest-annual bioscience payroll is Milwaukee ($437.7 M). It is larger than Waukesha ($408.4 M), which is marginally larger than Dane ($403.7 M). These are markedly larger than the next set of counties: Brown ($38.9 M), Sheboygan ($35.7 M), and Kenosha ($35.5 M).

There are other points that made by these numbers. The first is that these three counties, Dane, Milwaukee, and Waukesha, have 69% of the state's bioscience employment and over 75% of the bioscience payroll. The other 31% of employment is spread over the remaining 50 counties that have bioscience employment. Second, the bioscience payroll in each of the top three counties is at least ten times those found in other counties. Bioscience activity, though widely geographically dispersed, is also highly economically concentrated.

Another way to look at the impact of bioscience on the counties is to examine the proportion of the total payroll in the counties that can be attributed to bioscience. This time the focus will be on but six counties, as the proportion of county payroll attributable to bioscience gets pretty small after the top counties are examined.

There are some variations in proportions across counties. As might be expected, Waukesha County has the highest percentage (3.9%) of payroll attributable to bioscience (Table 5). Dane is lower (2.9%), followed by Milwaukee (1.9%), and Kenosha (1.8%). Beyond those counties, the percentages are relatively small, even where the payroll numbers remain notable.

Table 5 Ratio of Bioscience Payroll to All Payroll, Select Counties

COUNTY	$ BIO/ALL IND.
Waukesha	3.90%
Dane	2.9
Milwaukee	1.9
Brown	0.6
Sheboygan	0.5
Kenosha	1.8

DISTRIBUTION BY ECONOMIC REGION

To aid economic development and inter-county cooperation, Wisconsin has largely been divided into economic regions. Seven of these regions are formally organized. The regions vary in size from 3 to 18 counties, but they share a common goal, growing the economy in their individual region.

WISCONSIN'S ECONOMIC DEVELOPMENT REGIONS

Centergy
Marathon, Wood, Portage

Grow North
Oneida, Vilas, Forest, Lincoln County (north)
(Langlade and Iron are informal participants).

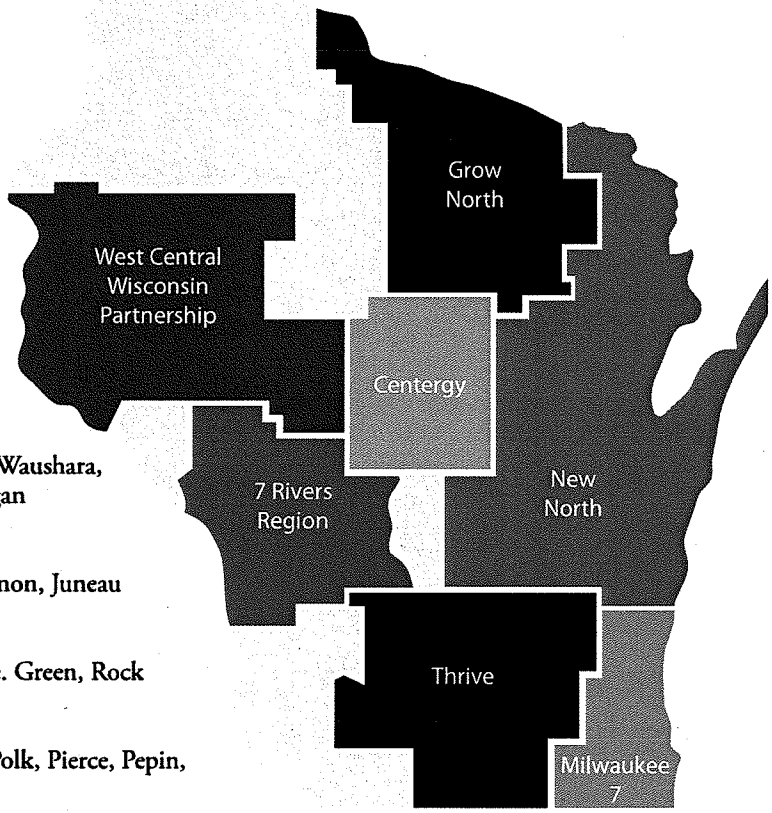
Milwaukee 7
Milwaukee, Ozaukee, Washington, Waukesha, Racine, Walworth, Kenosha

New North
Florence, Marinette, Oconto, Menominee, Shawano, Waupaca, Outagamie, Brown, Door, Kewaunee,Manitowoc, Calumet, Winnebago, Waushara, Marquette, Green Lake, Fond du Lac, Sheboygan

7 Rivers Region
Trempealeau, Jackson, La Crosse, Monroe, Vernon, Juneau

Thrive
Sauk, Columbia, Dodge, Jefferson, Iowa, Dane. Green, Rock

West Central Wisconsin Partnership
Barron, Dunn, Chippewa, Clark, Eau Claire, Polk, Pierce, Pepin, Rusk, St. Croix



As of January 2008, 58 of Wisconsin's 72 counties were members of a regional economic development organization. Because of such organizations, it was determined that these regions were the appropriate scale at which to undertake further analysis of bioscience in Wisconsin. An initial analysis involves examination of employment across the seven regions.

Table 6
Private Bioscience Employment by Economic Region

REGION	EMPLOYMENT
Milwaukee 7	12,126
Thrive	7307
New North	2,500
West Central	827
Centergy	526
7 Regions	234
Grow North	100

As might be expected from the discussion above, bioscience employment in Wisconsin is highly concentrated (Table 6). The combination of Milwaukee 7 and Thrive accounts for 19,432 jobs or about 81% of all bioscience employment in the state. The other regions vary from a low of 100 jobs in Grow North to 2,500 in New North. Bioscience may be distributed into 53 counties and seven regions, but the great majority of activity is in the southeast (Milwaukee 7) and Thrive (Madison) regions. As we learned, three counties are the drivers.

ECONOMIC IMPACT OF BIOSCIENCE

To calculate the economic impacts of bioscience activities, we relied upon one of three generally available software packages that allows for analysis of the impact of employment from specific activity, be it industries or activity, such as a firm or a new development. We elected to use IMPLAN because of its availability and its ease of use. One team member uses it often to undertake economic impact analysis.

IMPLAN uses information on employment to generate other employment numbers and economic impacts of those additional employment numbers. Thus, we learned of the employment by specific industry and region from the ES202 data file provided by the Wisconsin Department of Workforce Development. Totals for the 21 NAICS-code industries were computed for each economic region. These figures, in turn, were entered into the model to see just what sorts of multiplier impact they had on their respective communities.

To undertake this analysis, three different components were analyzed. The first is the state-wide impact of bioscience on employment and income. The second is to learn just what each region's share of those impacts is. The third is an analysis of the impacts of university research on the state and on two specific regions, Milwaukee's and Madison's. We start with an analysis of the biggest area, the state of Wisconsin.

WISCONSIN

Each set of computations is based on one figure, employment, and a series of built-in assumptions on the relationship of employment in a particular industry and the employment and income impacts that are derived from that basic employment. As the reader will recall, the state has bioscience in 21 categories of bioscience. Some industries are large while others are rather small. Regardless, the employment in each industry code was plugged into the model to yield a series of direct and indirect impacts. These are both employment and income impacts. The income impacts are derived from knowledge of salary structures in particular industries. Those in turn help to derive the income projections.

Thus, in a given firm, money is spent on labor, and it is also spent on goods and services from other local businesses. Both are accounted for in the IMPLAN model. The effects of businesses purchasing goods and services from other local businesses are counted in the "indirect effects." The impacts of those dollars being spent by the employees of both the original firm and the other local firms from which goods and services are purchased are then included in the "induced effects." In this instance Table 7 has combined the Indirect and Induced effects that the IMPLAN model generates. Of greater interest are the Total Effects. That is what will be most discussed.

Table 7 Economic Impact of Private Bioscience Activity in Wisconsin

IMPACT TYPE	EMPLOYMENT	LABOR INCOME	TOTAL INCOME
Direct Effect	23,919	$1,652,717,076	$2,422,098,205
Indirect & Induced Eff.	39,380	$2,229,078,742	$3,613,508,187
Total Effect	63,300	$3,881,795,818	$6,035,606,392

As was noted above, the total Bioscience employment in Wisconsin is in the neighborhood of 23,919. We have already discussed some of the oversights of the various data sources available to do these calculations. We urge the reader to accept that this is likely an understatement, but one that cannot easily be upgraded.

The employment impact of bioscience work is a multiple of the 23,919. Because dollars are spent in the state by the firms located here and by their employees, more jobs are generated. Those additional jobs that are linked to indirect and induced activities total 39,380, bringing the total impact of bioscience private employment in the state of Wisconsin to 63,300 jobs.

The dataset employed for this analysis benefits from having payroll data. These data are not normally available and usually have to be estimated. The numbers in this report are official reports. Thus, the total payroll of the 751 bioscience establishments was $1.652B in 2009. The total labor income from both direct, and indirect and induced income is $3.88B.

Firms also buy goods and services from one another locally. In this fashion dollars spent locally are re-spent, creating a larger impact than that of the initial purchase. When these repeated expenditures are tracked, they begin to add up. And when they are combined with direct labor income and that created by indirect and induced effects, the total effect grows. Thus, the total payroll of the 751 bioscience establishments was $1.652B in 2009. The total labor income from both direct and indirect and induced income is $3.88B. In Wisconsin the total income from bioscience activities within the state are estimated to total $6.04B in 2009.

IMPLAN also creates a number of additional calculations to better reveal the impact of the subject being studied. One set of calculations deals with a variety of taxes generated. Biosciences employment in the private sector collectively generated more than half-a-billion dollars ($547,758,388) in taxes in 2009. That is a substantial figure. The details appear below in Table 8. The largest single tax contribution is property tax, and others are substantial as well. The point is that bioscience firms and their employees do more than just spend incomes; they also contribute in many ways to the community and state through tax payments.

Table 8
Wisconsin Estimated Tax Contributions from Bioscience Employment

Income Tax	$92,495,526
Sales Tax	$126,502,249
Property Tax	$167,189,136
[illegible] Tax	$19,249,188
[illegible]	$142,385,289
[illegible]	$7,828,388

ECONOMIC REGIONS

Statewide impacts are one thing; it is still of interest to examine in detail at the regional level just what impact the bioscience activity has on the regional economies. To do this, we shall first look at some simple measures of that impact, the number of direct jobs generated, the number of establishments, and the size of the bioscience payroll. We shall then examine the economic regions with larger bioscience sectors and disaggregate those figures into subsectors to gain some insights as to which types of bioscience dominate where.

Table 9
Regional Distributions of Employment, Establishments, and Payroll

REGION	EMPLOYMENT	ESTABLISHMENTS	PAYROLL ($)
Milwaukee 7	12,126	294	951,863,108
Thrive	7,307	184	473,904,264
New North	2,500	118	117,109,908
West Central	827	49	43,060,772
Centergy	526	29	29,549,824
7 Rivers	234	21	10,207,320
Grow North	100	9	4,034,700

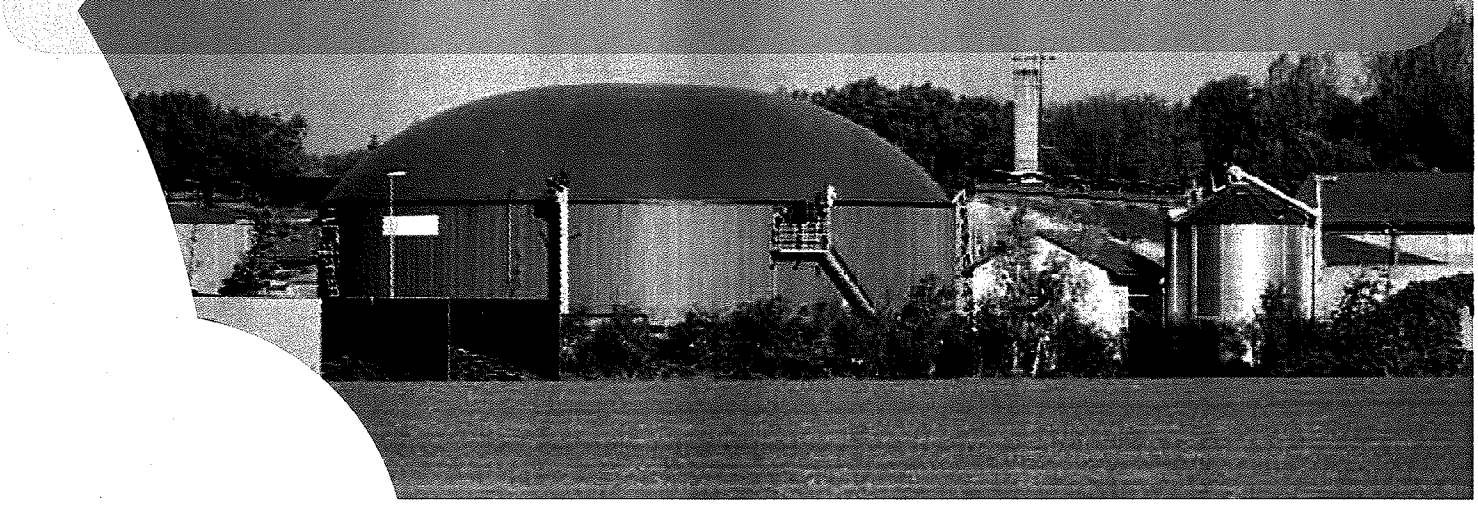
It is clear from the employment and the payroll distributions that two regions dominate in terms of bioscience activity. The Milwaukee 7 and Thrive regions together have 81% of Wisconsin's private-sector bioscience employment and 86% of the state's bioscience payroll. New North, with 2,500 bioscience workers and $117M in payroll is a player, but it is far smaller than the other two regions. New North has 7% of the bioscience payroll and a bit over 10% of the employment.

In terms of establishments the combined Milwaukee 7 and Thrive regions have relatively fewer, just under 64%. But what those regions have are larger, more established firms as well as many smaller ones. The bioscience employers in these two regions have the resources to pay their employees more than occurs elsewhere in the state, on average.

Another way of examining the regions is to examine the distribution of the number of establishments, the total employment, and the total payroll by bioscience subsector. Some may want to see these numbers by specific industry, but the numbers in some cases are too small to reveal. Therefore, we examine these figures for the four largest regions in terms of bioscience employment, Milwaukee, Thrive, New North and West Central Partnership. The numbers appear in Table 10.

Table 10 Selected Region Distributions by Bioscience Subsectors

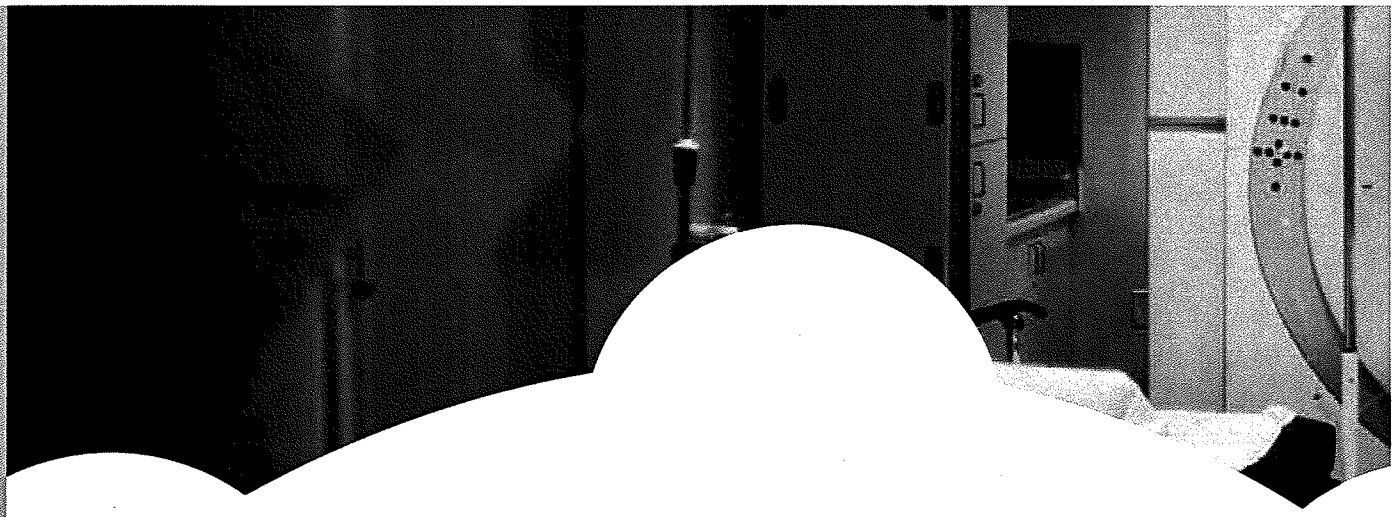
BIOSCIENCE CATEGORY	MEASURE	MILWAUKEE 7	NEW NORTH	THRIVE	W. CENTRAL
Ag Feedstock & Chemicals					
	Establish.	18	9	19	6
	Employment	897	445	998	154
	Payroll	53,093,752	20,590,168	58,644,044	8,078,636
Drugs & Pharmaceuticals					
	Establish.	20	5	29	4
	Employment	1069	331	2,046	51
	Payroll	73,458,708	16,124,848	140,754,124	2,154,120
Medical Devices & Equip					
	Establish.	143	48	65	23
	Employment	7,650	1,052	2,527	314
	Payroll	685,446,712	48,136,080	179,332,204	11,314,780
Research, Testing & Med Labs					
	Establish.	43	56	71	16
	Employment	2,510	673	1732	309
	Payroll	139,863,936	32,258,312	95,173,892	21,513,236



There are several revealing ways to examine these numbers. One is to just look at the scale. The numbers are small across the board in the Agricultural Feedstock and Chemicals subsector. There are a limited number of such establishments in WI and these regions. Not much larger in terms of establishments but considerably larger in terms of payroll are the Milwaukee 7 and Thrive regions in their involvement in Drugs & Pharmaceuticals. In Thrive in particular, the payroll is twice that of Milwaukee.

Medical Devices and Equipment has varying degrees of regional importance. It is clearly the largest subsector in the Milwaukee 7. It has the most establishments and employees, and the largest payroll of all subsectors. Milwaukee's payroll is almost 4 times larger than Thrive's. Thrive has its largest employment and payroll here, but not its largest number of establishments. What may also be of note is the average employment size varies dramatically by region, from about 53 in Milwaukee 7 to 13 in West central. These employers are quite different even though they may be in the same subsector.

Research, Testing, & Medical labs have the second most establishments overall and in two of the regions. One point to note is that the Milwaukee 7 labs, on average, are much larger than those found in the other regions. The range is from 58 workers in Milwaukee 7, on average to 12 in New North. These types of comparisons suggest that even by isolating industrial subsectors, employers are still quite different by geographic location.



LARGER IMPACTS OF BIOSCIENCE EMPLOYMENT ON REGIONS

Having examined the basic numbers on direct impacts of biosciences within the major regions, it is now time to examine the results of an effort to replicate the projection of the economic impact for each of the seven regions, as was done above for the state of Wisconsin. As some may note, the regional economic impact of bioscience employment largely reflects the geographic distribution of the direct employment. But what is also noteworthy is that some regions, basically the large urban regions with multiple places to spend individual and business income, have higher multipliers that yield somewhat disproportionate results, both in terms of employment and in income.

Table11 Economic Impacts of Private Bioscience Activities in Economic Development Regions

REGION		BASIC MEASURES		
	Type of Number	Employment	Labor Income ($)	Total Income ($)
Milwaukee 7				
	Actual	12,126	951,863,108	1,220,053,753
	Indirect & Induced	20,135	1,276,659,769	2,075,812,740
	Total	32,261	2,228,522,877	3,295,866,493
Thrive				
	Actual	7,307	473,904,264	665,657,580
	Indirect & Induced	9,644	535,248,531	884,252,851
	Total	16,947	1,009,152,795	1,594,910,431
New North				
	Actual	2,500	117,109,908	190,061,765
	Indirect & Induced	1,504	116,855,502	158,454,784
	Total	4,004	233,965,410	348,516,459
W. Central				
	Actual	827	43,060,772	61,700,600
	Indirect & Induced	680	33,020,647	55,544,205
	Total	1507	76,081,419	117,244,805
Centergy				
	Actual	526	29,549,824	44,713,150
	Indirect & Induced	414	13,105,620	21,977,340
	Total	940	42,655,444	66,690,490
7 Rivers				
	Actual	234	10,207,320	15,650,724
	Indirect & Induced	80	7,107,923	12,172,506
	Total	314	17,315,243	27,823,323
Grow North	NA			

The first thing to note in Table 11 is that the total effect in each region for each measure is substantially larger than the numbers in the top line. This is because of the multiplier effect of additional spending done at the local (regional in this case) level. Thus, in the Milwaukee 7 region, the bioscience sector's direct employment of 12,126 jobs generates an additional 20,135 jobs because of locals spending for labor, goods and services. Because the Milwaukee 7 region has more options for those expenditures and can meet more of those needs, the employment multiplier is larger than in any of the other regions. The total is estimated to be 32,261 jobs contributed by bioscience employment either directly or indirectly. In Thrive the total becomes 16, 947 jobs, far more than the 7,307 direct jobs might imply.

When we look at the combination of the two dominant regions, Milwaukee 7 and Thrive, we learn that the total employment grows from the direct number of 19,433 to 49,208, a combination of the direct employment and that which is created through the multiple uses of the original dollars associated with payment for labor and payment for goods and services.

Income figures are enlarged proportionately. The regional economies all grow because of the presence of bioscience employment. As we learned in looking at Wisconsin as a whole, incomes in the state grew by over $6B because of the presence of bioscience employment. The Milwaukee 7 region accounts for 55% of the total income generated, and Thrive accounts for 25%. Collectively, that is greater than 80% of the economic impact.

That said, some of the other regions also benefitted. It is just that they did not do so on the same scales. New North added 1,504 jobs because of the initial 2,500 bioscience jobs there. West Central added 680 because of the presence of 827 bioscience jobs. Even the 7 Rivers Region added 80 jobs because of the initial 234 biosciences jobs. Similar patterns existed across regions in terms of incomes: bioscience jobs create positive impacts in many other sectors in these regions.

UNIVERSITY RESEARCH IMPACTS

To attempt to account for academic research in bioscience fields, it was necessary to learn more about just how much bioscience research is undertaken in Wisconsin on an annual basis. The common source of such information is the National Science Foundation. On its website it lists the bioscience and engineering expenditures at close to 1000 colleges and universities. The lists are in order of scale; those with the most expenditures are listed first. The NSF website was the source of the dollars expended at Wisconsin's colleges and universities. In April 2010, NSF published the figures for 2008-09. That is not the most recent, just the most recently available.

If we were to look at the most recent information on UWM, for example, we would find its contribution has increased, more than doubling the research dollars and the number of workers that can be attributed to bioscience at UWM and in the Milwaukee 7 region. This type of increase should continue as the university adds more researchers in bioscience, engineering and freshwater sciences.

An attempt was made to gather bioscience research grant dollars from the individual institutions, but this proved problematic, as none of the institutions classified their research dollars under the heading of "biosciences." It proved to be very difficult to cull through their lists of research awards and pick those that are likely to be bioscience. Instead, we relied on the NSF counts, even though they are one year older. At least they are very comparable to what others have used.

University bioscience research is an important contributor to the state's bioscience field, both in terms of intellectual property and economic impact. As was noted briefly above, one institution, UW-Madison, contributes markedly to the Thrive and Dane County economy, and three other institutions, the Medical College of Wisconsin, UW-Milwaukee, and Marquette University, contribute substantially to the bioscience employment of the Milwaukee 7 region and of Milwaukee County.

Table 12 reveals the dollars of public and private funding for bioscience and bioengineering that all colleges and universities in Wisconsin received in 2008. This is the most-recent year for which the National Science Foundation has compiled the numbers. Clearly dominating the list is UW-Madison; it received over $571M that year. The Medical College of Wisconsin has also done very well. It brought in $165M that year. UW-Milwaukee, Marquette, and UW- Stevens Point round out the top five, collectively adding $18.8M. Other higher education institutions in the state received $3.8M.

Table 12
2008 Bioscience R&D Expenditures at Wisconsin Colleges & Universities

UNIVERSITY	LIFE SCIENCES ($)*	BIO/BIOMED ENG ($)*	TOTAL ($)*
UW- Madison	567,870	3,458	$571,328
Medical College of WI	165,529	0	165,529
UW-Milwaukee	10,941	0	10,941
Marquette Univ.	3,855	2,619	6,474
UW-Stevens Point	1,451	14	1,465
MSOE	875	99	974
UW-Oshkosh	964	0	964
UW-La Crosse	808	0	808
UW-Platteville	335	0	335
UW-Eau Claire	313	0	313
UW-Whitewater	236	0	236
UW-Stout	87	0	87
UW-Parkside	76	0	76
TOTAL	753,340	6,190	759,530

*Dollars in Thousands
Source: National Science Foundation 2010

To estimate the economic impact of this research on the Wisconsin and two regional economies, these expenditures need to be translated into number of jobs they created. The way this was elected to be done was to borrow some numbers from a Michigan study of Bioscience that derived the numbers for its universities (Feinstein et al 2009). The basic number used was that one job was created for each $170,833 of bioscience research at the University of Michigan, part of a large metro area. And one job was created for each $95,640 at Michigan State, a more isolated area. The UMI number was applied to Madison and Milwaukee while the MSU number was used in the other parts of the state.

The results of the calculations are that R&D in the biosciences created an estimated 4,470 additional jobs in the state. The bulk of these jobs were either in Dane or Milwaukee County. Thus, Dane is home to 3,344 of these jobs while Milwaukee is home to another 1,071; together they are home to 4,415 of the 4,470 academic jobs. Thrive is home to 75% of these research jobs and Milwaukee 7 is home to 24%.

Table 13
Estimated Numbers of Direct Jobs Created by Research Expenditures

UNIVERSITY	JOBS CREATED
UW-Madison	3,344
MCW	969
UW-Milwaukee	64
Marquette	38
Other	55
Total	4,470

Ideally, we would have been able to use IMPLAN to estimate the impacts of university research on the larger economy beyond the direct jobs. For a variety of reasons, that proved to be difficult to do. An alternative is to estimate this, based on the recent experience in Michigan (Feinstein et al 2009). Using a computer model, they projected that university employment had a multiplier of 2.000. Thus, it is likely that the 4,470 jobs created at Wisconsin colleges and universities virtually doubled in terms of its impact on the larger economy. In other words, another 4,470 jobs were created in Wisconsin because of the presence of a similar number of bioscience jobs.

It is much more difficult to try to compute the income impact, but a simple proportionate calculation yields a reasonable estimate. The initial 4,470 academic bioscience jobs yielded approximately $638M in direct and indirect earnings. That is a sizable sum and further adds to the state's economy. Furthermore, it is estimated that this bioscience employment has an overall impact on the economy of about $739M. This can then be combined with the estimate $6B dollars that the private-sector biosciences generate in Wisconsin, bringing the total to $6.8B. In calculating the estimated taxes to Wisconsin, academic employment would likely enlarge the figure by about $67M bringing the total to $614M in tax revenue for the various levels of government.

If we were to attempt to distribute these impacts to the Milwaukee 7 and Thrive regions, it would make sense to allocate them proportionately to the R&D employment. Thus, Thrive would benefit from 75% of the gain in employment and Milwaukee 7 would benefit from 24% of the gain. The same proportions can reasonably applied to the income and total impact on the economies. Thus, Thrive could be said to have benefited from another $554M injection because of the research undertaken at UW-Madison. The Milwaukee 7 region is estimated to have gained $177M in total.

Those sums would suggest that the Thrive economy added a total of 23,635 employees that can be attributed directly and indirectly to bioscience activity in the region. Milwaukee's gain is not as dramatic, but its overall employment gain due to the presence of bioscience is an estimated 34,403 jobs. Both regions can say definitively that the bioscience sector is an important element in their regional economies.

CHANGE OVER TIME IN BIOSCIENCE

The final step in the analysis involved taking a look at the same data base for the first quarter of 2004 to see what we could learn about changes over close to six years in the bioscience industry in Wisconsin. The query asked for all establishments and the information on employment and payroll. The findings and the comparable numbers appear in Table 14.

Table 14 Change in Bioscience Activities

MEASURES	Q1 2004	Q4 2009
Annual Payroll	$1,349,243,472	$1,652,717,076
Employment	23,279	23,919
Ave Earnings/Worker	$57,970	$69,096
# of Establishments	633	751

Several points are striking. Between 2004 and 2009 the bioscience industry in Wisconsin expanded the number of business establishments by 19%, grew the total payroll by over 22% in current dollars while increasing average earnings per worker by 19%. Total employment grew as well, enlarging by 3% in contrast to the rest of the state economy that shrunk by over 3% in terms of employment. These numbers suggest the presence of a rather dynamic industry in the intervening years.

CONCLUSION

Bioscience is a dynamic and broadening field, and an important industry in Wisconsin across the private and academic sectors. It has significant impacts beyond its basic employment contribution and offers meaningful opportunities for Wisconsin's economy.

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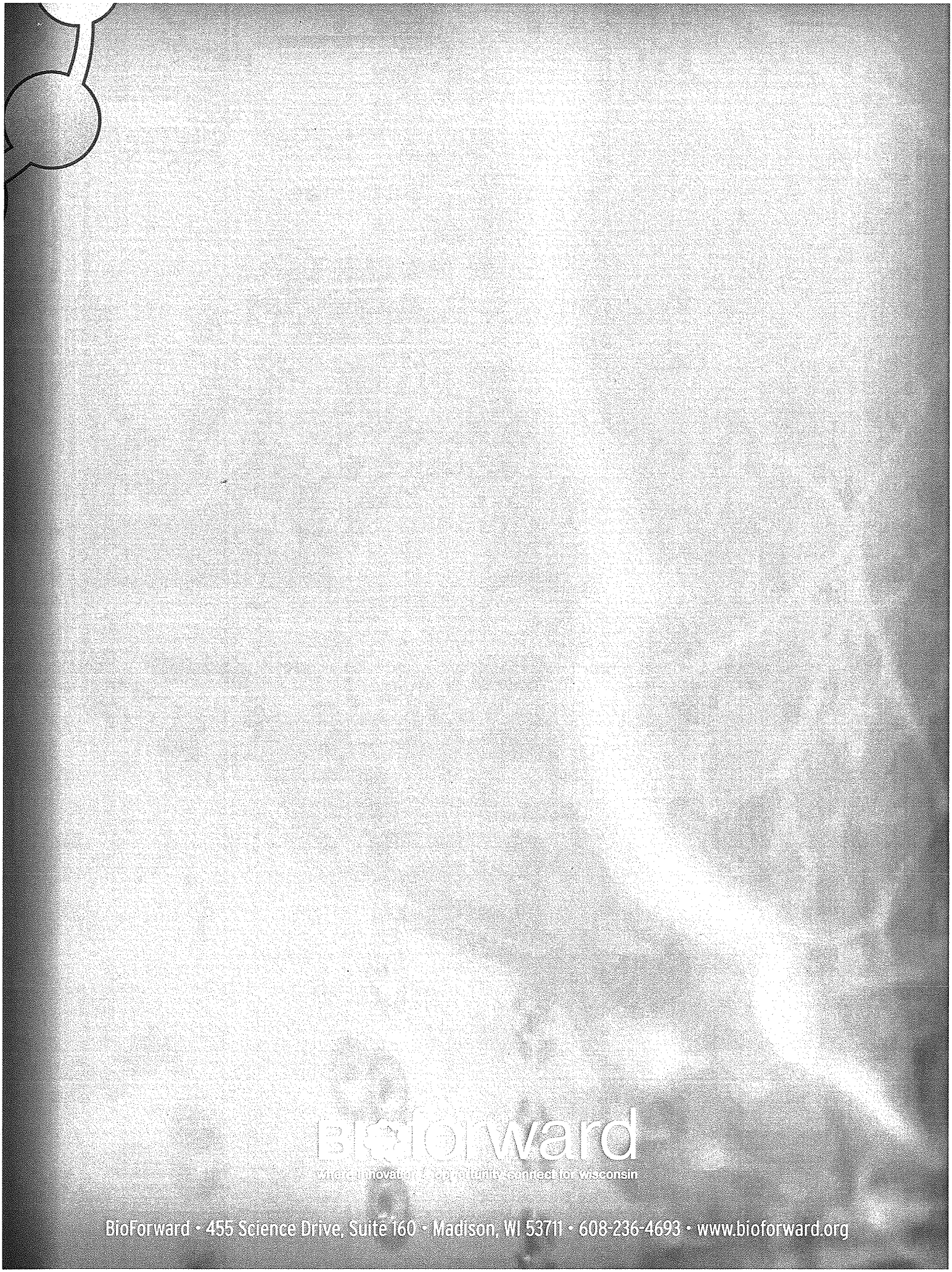

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